

A new record of the exotic Guapote jaguar, *Parachromis managuensis* (Günther, 1867) (Cichliformes, Cichlidae) in a tropical coastal lagoon of the Mexican Pacific slope

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Abstract

The presence of *Parachromis managuensis* has been reported for the first time in the Tres Palos Lagoon, State of Guerrero, on the coastal Lagoon of the Mexican Pacific slope. Two specimens (189 mm and 215 mm standard length) were caught by local fishermen from the community of San Pedro de Las Playas. A description of the morphological and meristic characters of the specimens is provided. The natural distribution of the species is from Honduras to Costa Rica and, as it is predatory and highly territorial, in conjunction with other introduced species, it can present a risk to native species and alter the biological dynamics in the lagoon system.

Keywords

Eastern Pacific, exotic species, jaguar cichlid, Mexico, non-native species

Introduction

The Guapote jaguar *Parachromis managuensis* is native to Central America, its natural distribution being from the Ulua river to the watershed of the Matina river on the Atlantic slope in Costa Rica (Bussing 1998). It inhabits a lentic environment

between 0 and 45 m a.s.l., preferably within turbid waters with muddy and eutrophic bottoms (Conkel 1997) and it is tolerant of hypoxic conditions (Nassar and Günther-Nonell 1992). It has an extremely aggressive and territorial behaviour which is accentuated in the mating season (Barbosa et al. 2006). It is also one of the largest piscivorous cichlids of Central America, with males growing to 65 cm and females 40 cm total length (Conkel 1997). At the adult stage, their diet includes a wide diversity of fish, but in the juvenile stage, invertebrates comprise an important part of their diet (Gestring and Shafland 1997).

The Guapote jaguar has importance for the artisanal fisheries for the Central American countries (Miller et al. 2009; Nico et al. 2019). It has also been cultivated to control fish populations, food production, and aquarism (Dunseth and Bayne 1978; Miller et al. 2009), hence its introduction to multiple aquatic systems in other countries (Barros et al. 2012; França et al. 2017; Nico et al. 2019; Holmes et al. 2020). In Mexico, it was introduced through aquaculture and restocking in systems for fishing development; currently, it has propagated throughout different systems intentionally and accidentally (Amador-del Ángel and Wakida-Kusonoki 2014a). The sightings of this exotic species correspond to the southern region of the country, in coastal systems of the Atlantic: Laguna de Términos, Palizada and Silvituc, Campeche (Olvera et al. 1994; Vidal-Martínez et al. 2002; Barrientos-Medina 2004; Amador-del Ángel et al. 2009); Forest “El Ocote” and the dam La Angostura, Malpaso, Cañón del Sumidero, Chiapas (Pineda-López et al. 1985; Velázquez-Velázquez et al. 2014; Anzueto-Calvo et al. 2016); and Laguna Santa Anita, El Espino, Jonuta, Puyucatengo river and Emiliano Zapata, Tabasco (Contreras-Balderas 1999; Amador-del Ángel and Wakida-Kusonoki 2014b). Recently, its northern invasion to the Mexican Atlantic coast, in the Alvarado Lagoon, Veracruz has been reported. However, there is only one record on the Pacific slope, on Soconusco Chiapas (Velázquez-Velázquez et al. 2016). The objective of this contribution is to identify a new record of *Parachromis managuensis* in a tropical coastal lagoon of the Mexican Pacific coast.

In a prospective fishery study in the Tres Palos Lagoon, Guerrero, over the period from May 2019 to February of 2020, the commercialised artisanal catches of the Guerrero community from Acapulco, San Pedro de las Playas (16°49'23"N, 99°43'40"W; Fig. 1) were analysed. They consisted of 14 species: eleven were native (*Amphilophus trimaculatum*, *Ariopsis guatemalensis*, *Centropomus robalito*, *C. nigrescens*, *Eleotris picta*, *Gobiomorus maculatus*, *Dormitator latifrons*, *Lile stolifera*, *Mugil setosus*, *Oligoplites altus* and *Trinectes fonsecensis*) and three were exotic (*Oreochromis aureus*, *O. mossambicus* and *Parachromis managuensis*).

In December 2019, two adult specimens of the Jaguar cichlid *Parachromis managuensis* were found (189–215 mm SL; Fig. 2). The individuals were fixed in 10% formaldehyde, preserved in ethyl alcohol (70%), and placed in the Colección Ictiológica of the Facultad de Estudios Superiores Iztacala (CIFI), UNAM (Sabaj 2019). Their species identity was confirmed by the dichotomous key proposed by Bussing (1998). The measurements and meristics of both specimens follow the Hubbs and

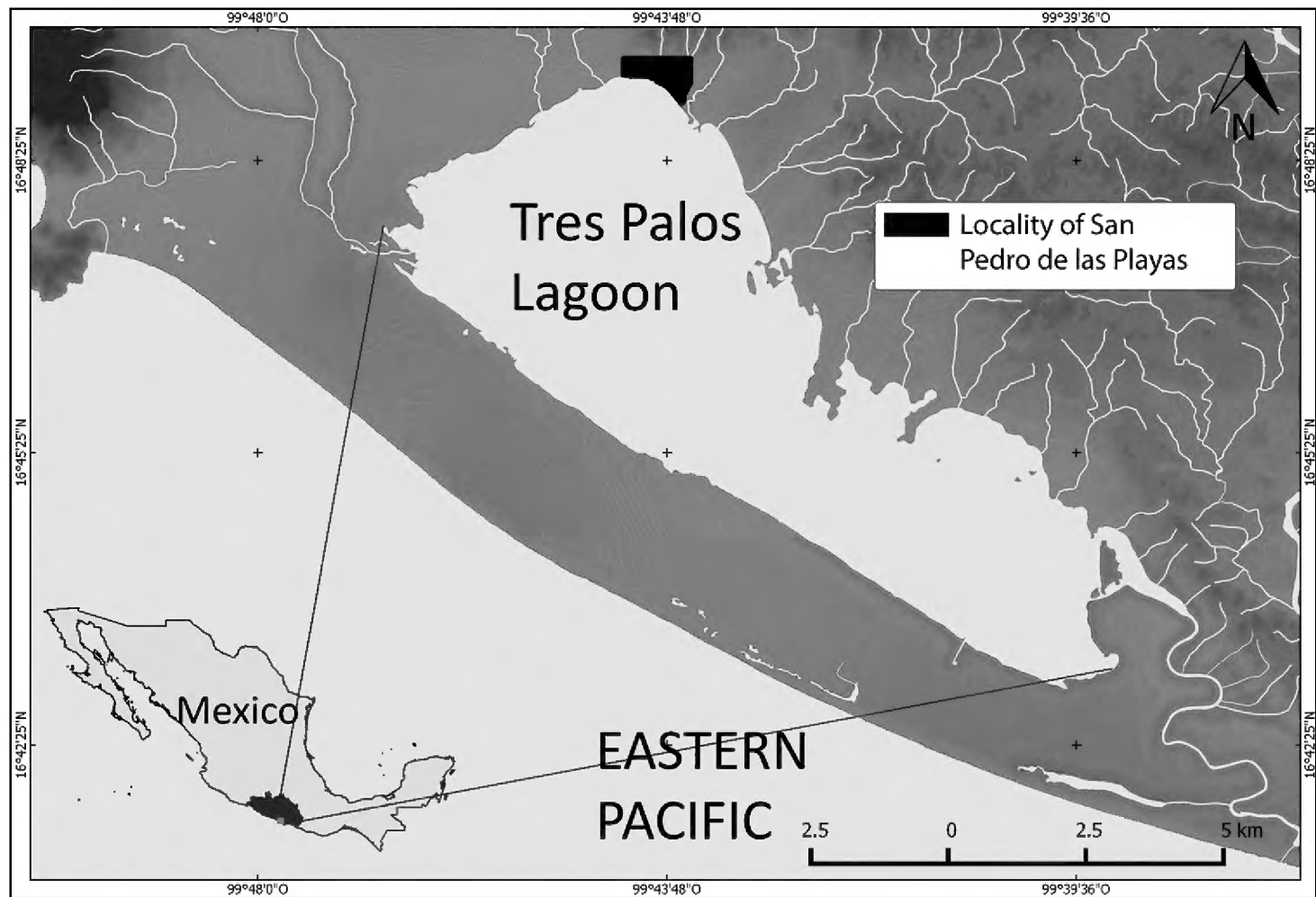


Figure 1. Southwestern Mexico map, of the town Tres Palos Lagoon, Guerrero, pointing out the main town (San Pedro de Las Playas).

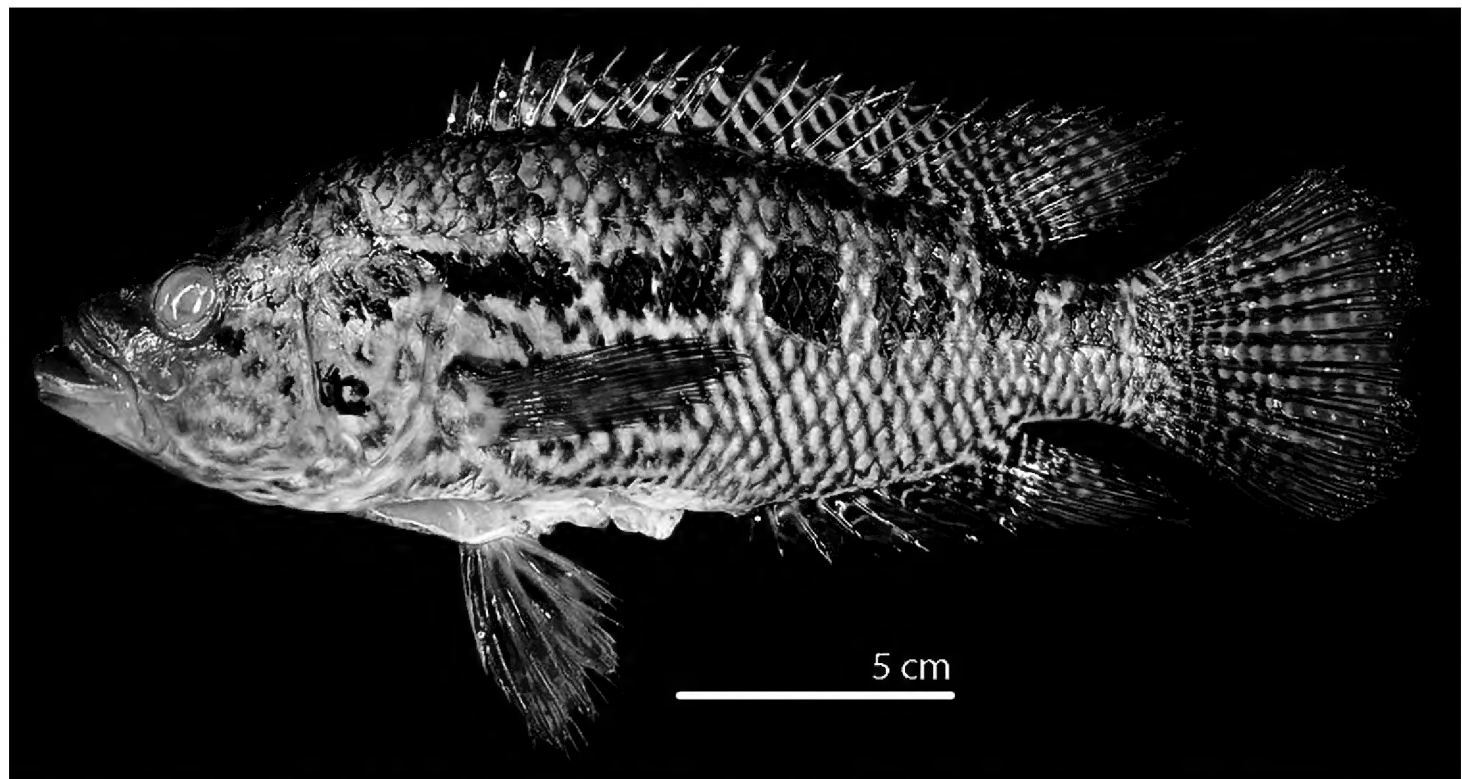


Figure 2. Photograph of the specimen of Guapote jaguar, *Parachromis managuensis* (CIFI 1572-1, 270 mm TL), freshly caught and commercialized in the artisanal fisheries of San Pedro de Las Playas, Tres Palos Lagoon, Guerrero, Mexico. Showing typical coloration formed by the black-spotted pattern on the body.

Lagler protocol (1958), with modifications referred to by Taylor and Miller (1980); for both specimens of *P. managuensis* (catalog number CIFI-1572) were the following: dorsal fin XVII-XVIII 11–13; anal fin VII 9, pectoral fin 13, pelvic fin I 5, caudal fin 16; three-gill rakers on the upper limb of the first-gill arch, 7–8 gill rakers on the lower limb of the first-gill arch, 20–22 scales in the upper lateral line with pores, 13 lower lateral line scales with pores, 15–19 scales around the caudal peduncle. The morphometric data are shown in Table 1.

The first records of exotic species in the Tres Palos Lagoon, correspond to Yáñez-Arancibia (1978) who captured five specimens (2 adults and 3 juveniles) of *Oreochromis mossambicus*, identifying a recent introduction either premeditated or accidental. This number showed that *O. mossambicus* had a low frequency and low abundance compared to the overall structure of the fish community. However, Yáñez-Arancibia focused on the future effects, such as substantial population growth and possible impact on the indigenous fauna. Subsequently and continuously, the collective fisheries along with governmental agencies introduced tilapia broodfish (*Oreochromis* aff. *aureus* and *O. mossambicus*) in order to promote fishing for the community and for the fisheries. Currently, species of the genera *Oreochromis* are, along with *Lile gracilis*, *Dormitator latifrons*, and *Ariopsis guatemalensis*, the most important and sustain the commercial fishing in the lagoon (Cabrera Mancilla et al. 2003; Gil-Guerrero et al. 2008). It is highly probable that the specimens of

Table 1. Morphological measurements expressed in mm of the two specimens of Guapote jaguar, *Parachromis managuensis*, captured in the Tres Palos Lagoon, Guerrero, Mexico.

Measurement /catalog number	CIFI-1572-1	CIFI-1572-2
Total length	270	242
Standard length	215	189
Head length	61	54
Upper-jaw length	21	20
Orbit diameter	12	10
Postorbital length	9	8
Interorbital width	18	17
Snout length	19	16
Suborbital length	23	21
Body depth	89	64
Caudal peduncle length	28	20
Caudal peduncle depth	28	24
Caudal peduncle length	28	24
Dorsal-fin base length	120	112
Anal-fin base length	60	51
Predorsal length	74	65
Preanal length	148	128
Prepectoral length	97	81
Prepelvic length	95	82
Length of the first dorsal spine	7	6
Length of the sixth dorsal spine	18	18
Length of the last dorsal spine	28	24
Pectoral-fin length	52	46
Pelvic-fin length	52	47

P. managuensis were present due to an introduction of tilapia seeds, so this would correspond to an accidental release.

Hitherto, there has only been one record of *P. managuensis* on any water bodies on the Mexican Pacific slope (Contreras-Balderas 1999; Espinosa-Pérez and Ramírez 2015; Velázquez-Velázquez et al. 2016). In this contribution, its presence was identified for the second time on a coastal lagoon of the Pacific, with a wide range of dispersion on the northern region of the neotropics. The introduction of predatory species affects the abundance, trophic relationships, and the distribution of the native species (Sharpe et al. 2017). Furthermore, one of the principal concerns is to avoid the dispersion to adjacent zones and the impact that this species can represent in conjunction with additional threats to the local wildlife. The presence of *P. managuensis* on the Mexican Pacific slope is an indication of its fast propagation in Mexico and its threat to autochthonous fish species. Therefore, significant efforts are necessary to comprehend and avoid the propagation of exotic fishes, support conservation, and diminish negative impacts on native communities. It is necessary to have constant monitoring of the fish community in the Tres Palos Lagoon and to implement joint actions to eradicate non-native species.

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